IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicants:	Eric A. Jacobsen	§	Art Unit:	2662
		§		
Serial No.:	09/855,132	§		
		§	Examiner:	Dmitry Levitan
Filed:	May 14, 2001	§		
		§		
Title:	TECHNIQUE FOR CONTINUOUS OFDM MODULATION	§	Docket No.	ITL.0548US (P11107)

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

REPLY BRIEF

Dear Sir:

Applicant submits the following reply to the Examiner's Answer.

I. GROUPING OF THE CLAIMS

The Examiner's Answer states that the § 102 rejections of claims 9, 19 and 29 have been withdrawn. Claims 1-8 and 10 are grouped together; claims 11-18 and 20 are grouped together; and claims 21-28 and 30 are grouped together.

Date of Deposit: July 12, 2004
I hereby certify under 37 CFR 1.8(a) that this correspondence is being deposited with the United States Postal Service as **first class mail** with sufficient postage on the date indicated above and is addressed to Mail Stop **Appeal Brief-Patents**, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Janice Munoz

II. REPLY TO EXAMINER'S ARGUMENTS

The §§ 102 and 103 rejections of the claims are directed to the issue of whether claim limitations that are neither explicitly nor implicitly taught by van Nee are inherent in van Nee. In reaching a conclusion of inherency, the Examiner refers to the language found in lines 3-21 in column 3 of van Nee, and based on this language states, "van Nee teaches scaling down the number of carriers/excluding carriers to reduce implementation complexity of his system." Examiner's Answer, 7. The Examiner concludes "the alternative of performing mathematical operation with no input subcarriers, suggested by Appellant on page 18 of the Brief, has no basis because it contradicts the premise of scaling down the number of carriers." *Id.*, 8.

However, contrary to the Examiner's untenable conclusion, van Nee reaches its alleged goal (the goal of scaling down of carriers, as contended by the Examiner), regardless of whether or not mathematical operations that are associated with subcarriers that are not assigned to modulate data are excluded from the IFFT.

More specifically, the claims set forth that a discrete frequency transformation is based on the number of subcarriers in a set of subcarriers. The Examiner refers to the X-point IFFT 16 of van Nee and contends this IFFT is the alleged discrete frequency transformation. Examiner's Answer, 4. Following the Examiner's labeling, the X-point IFFT 16 is based on the number, X, of subcarriers. The Examiner selectively blends van Nee's discussion of an N-point IFFT (as pointed out in the Appeal Brief, N is greater than X) with the X-point IFFT 16. However, this X-point IFFT *is not based on N subcarriers* (*emphasis added*). Instead, van Nee's X-point IFFT is based on X subcarriers. Therefore, van Nee's discussion of scaling N subcarriers to X subcarriers is irrelevant, as the exclusion of the N-X subcarriers falls outside of the claim limitations. In other words, van Nee does not teach or imply scaling down

subcarriers when an N-point IFFT (i.e., an IFFT based on N subcarriers) is performed; and van Nee does not teach or imply scaling down subcarriers less than X when an X-point IFFT (i.e., an IFFT based on X subcarriers) is performed. Instead, X subcarriers are used for an X-point IFFT, N subcarriers are used for an N-point IFFT, etc.

Therefore, Applicant's argument in the Appeal Brief is entirely consistent with van Nee: 1. in accordance with the alleged goals of van Nee, "scaling" is used to reduce the N subcarriers to X subcarriers; 2. an X-point IFFT is then performed based on the X subcarriers; and 3. it is clearly an alternative that in this X-point IFFT, mathematical operations that are associated with some of the X subcarriers that are not assigned to modulate data are not excluded, i.e., zeros are assigned to these subcarriers. In short, van Nee does not teach or even suggest the advantages of excluding mathematical operations when performing the X-point IFFT or any other IFFT; and there is no teaching or implication in van Nee that the N-point IFFT is performed with only X subcarriers.

For a limitation to be inherent in a reference, the limitation must necessarily flow from the reference. M.P.E.P. § 2122; *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). Inherency "may not be established by probabilities or possibilities." *In re Robertson*, 49 USPQ2d. 1949, 1950-51 (Fed. Cir. 1999). The Examiner's arguments are not probative of whether the missing claim limitations are beyond a mere probability or possibility, as the arguments advanced by the Examiner fail to offer any explanation regarding why operations that are associated with some of the X subcarriers that are not assigned to modulate data are excluded from the X-point IFFT. As set forth above, van Nee's discussion of performing an X-point IFFT rather than an N-point IFFT has no bearing on whether the missing claim limitations are inherent in van Nee.

The § 112 rejections are in error for at least the reasons that are set forth in the Appeal Brief.

Accordingly, Applicant maintains that the §§ 102, 103 and 112 rejections are in error and should be reversed.

Respectfully submitted,

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APPENDIX OF CLAIMS

The claims on appeal are:

1. A method comprising:

basing a discrete frequency transformation on the number of subcarriers in a predetermined set of subcarriers, one or more subcarriers of the set assigned to modulate data and the remaining subcarriers of the set not assigned to modulate the data;

performing the discrete frequency transformation on the data to modulate the data; and

excluding from the transformation mathematical operations associated with the subcarriers not assigned to modulate the data.

2. The method of claim 1, wherein the excluding comprises:

excluding all of the subcarriers not assigned to modulate the data.

3. The method of claim 1, wherein the performing the discrete frequency transformation comprises:

performing orthogonal frequency division multiplexing modulation on the data.

4. The method of claim 1, wherein the performing comprises:

applying a weighting function during the discrete frequency transformation to perform symbol shaping.

5. The method of claim 1, wherein said one or more subcarriers are assigned to at least one of a user, an electrical device and a terminal.

6. The method of claim 1, further comprising:

using the modulated data to form an orthogonal frequency division multiplexing symbol.

7. The method of claim 1, further comprising:

using the transformation to generate symbols at a rate defined by a symbol generation interval;

basing the discrete frequency transformation on the symbol generation interval; and

using the discrete frequency transformation to generate discrete modulated values for an interval that exceeds the symbol generation interval to generate a cyclic extension.

8. The method of claim 7, further comprising:

transmitting each of the symbols during one of the intervals that exceeds the symbol generation interval.

9. The method of claim 1, further comprising:

selectively pre-rotating phases of said one or more subcarriers to generate a cyclic prefix.

10. The method of claim 1, wherein the mathematical operations comprise at least one of an accumulate operation and a multiplication operation.

11. A system comprising:

a device to generate data to be modulated; and

a transmitter to:

base a discrete frequency transformation on the number of subcarriers in a predetermined set of subcarriers, one or more subcarriers of the set of subcarriers assigned to modulate data and the remaining subcarriers of the set not assigned to modulate the data;

perform the discrete frequency transformation on the data to modulate the data; and

exclude from the transformation mathematical operations associated with the subcarriers not assigned to modulate the data.

12. The system of claim 11, wherein the transmitter excludes all of the subcarriers not assigned to modulate the data.

13. The system of claim 11, wherein the transmitter performs orthogonal frequency division multiplexing modulation on the data.

14. The system of claim 11, wherein the transmitter determines components of the discrete frequency transformation independently from each other.

15. The system of claim 11, wherein said one or more subcarriers are assigned to one of a user, an electrical device and a terminal.

16. The system of claim 11, wherein the transmitter uses the modulated data to form an orthogonal frequency division multiplexing symbol.

17. The system of claim 11, wherein the transmitter:

uses the transformation to generate symbols at a rate defined by a symbol generation interval;

bases the discrete frequency transformation on the symbol generation interval; and

uses the discrete frequency transformation to generate discrete modulated values for an interval that exceeds the symbol generation interval to generate a cyclic extension.

18. The system of claim 17, wherein the transmitter transmits each of the symbols during one of the intervals that exceeds the symbol generation interval.

19. The system of claim 11, wherein the transmitter selectively pre-rotates phases of said one or more subcarriers to generate a cyclic prefix.

20. The system of claim 11, wherein the mathematical operations comprise at least one of an accumulate operation and a multiplication operation.

21. An article comprising a storage medium readable by a processor-based system, the storage medium storing instructions to cause a processor to:

base a discrete frequency transformation on the number of subcarriers in a predetermined set of subcarriers, one or more subcarriers of the set assigned to modulate data and the remaining subcarriers not assigned to modulate the data;

perform the discrete frequency transformation on the data to modulate the data; and

exclude from the transformation mathematical operations associated with the subcarriers not assigned to modulate the data.

22. The article of claim 21, the storage medium storing instructions to cause the processor to exclude from the transformation all mathematical operations associated with the subcarriers not assigned to modulate the data.

23. The article of claim 21, the storage medium storing instructions to cause the processor to perform orthogonal frequency division multiplexing modulation on the data.

24. The article of claim 21, the storage medium storing instructions to cause the processor to determine components of the discrete frequency transformation independently from each other.

25. The article of claim 21, wherein said one or more subcarriers are assigned to one of a user, an electrical device and a terminal.

26. The article of claim 21, the storage medium storing instructions to cause the processor to use the modulated data to form an orthogonal frequency division multiplexing symbol.

27. The article of claim 21, the storage medium storing instructions to cause the processor to:

use the transformation to generate symbols at a rate defined by a symbol generation interval;

base the discrete frequency transformation on the symbol generation interval; and

use the discrete frequency transformation to generate discrete modulated values for an interval that exceeds the symbol generation interval to generate a cyclic extension.

28. The article of claim 27, the storage medium storing instructions to cause the processor to:

transmit each of the symbols during one of the intervals that exceeds the symbol generation interval.

29. The article of claim 21, the storage medium storing instructions to cause the processor to:

selectively pre-rotate phases of said one or more subcarriers to generate a cyclic prefix.

30. The article of claim 21, wherein the mathematical operations comprise at least one of an accumulate operation and a multiplication operation.